

Preface

The main purpose of this treatise lies in applying the basic principles of pedology to soils of the tropical environments of the Indian subcontinent, with emphasis on ways to enhance crop productivity. Although much valuable work has been done throughout the tropics, it has been always difficult to manage these soils to sustain their productivity and it is more so when comprehensive knowledge on their formation remained incomplete for a long time. During the last few decades, research endeavour undertaken by the Indian pedologists and earth scientists of well-known institutions, especially by those in the ICAR-NBSS&LUP (Indian Council of Agricultural Research-National Bureau of Soil Survey and Land Use Planning), Department of Earth Sciences of the erstwhile University of Roorkee (presently known as Indian Institute of Technology, Roorkee) and Department of Geology, University of Delhi, has been commendable in terms of establishing an organic link between pedology, geomorphology, palaeopedology, mineralogy and edaphology of Indian tropical soils. This treatise thus makes a sincere attempt to showcase the research contributions on pedology, geomorphology, mineralogy, micromorphology and climate change collected from the published literature on three major soil types, i.e. shrink-swell soils, red ferruginous soils and soils of the Indo-Gangetic Plain(IGP) that occur in the tropical environments. The synthesis of literature attempts to provide insights into several aspects of five pedogenetically important soil orders like Alfisols, Mollisols, Ultisols, Vertisols and Inceptisols of tropical Indian environments. A special attention has been made to document the significance of minerals in soils and their overall influence in soil science in terms of pedology, palaeopedology, polygenesis and edaphology. Such knowledge base becomes critical when attempts are made to fill up the gap between food production and population growth.

A dire need for such a treatise has been felt amidst the myth on the formation of tropical soils in general and those in the Indian subcontinent in particular. Many such soils did experience the change of climate from humid to semi-arid environments in the Holocene period, and thus, their polygenetic history adds further challenges to soil/earth science researchers. In India, students of pedology (soil science) and pedogeomorphology generally come across extreme difficulties in

relating to examples applying the principles of soil science from textbooks devoted almost exclusively to soils of temperate climate of erstwhile Soviet Union, Europe and the USA. Therefore, the format is arranged for a process-oriented treatise as a reference for pedologists, allied earth scientists and M.Sc. and Ph.D. students and also for land resource managers who are engaged in enhancing the productivity of such tropical soils in changing scenario of climate change in India and elsewhere.

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